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ET/EN003/032
CIVIL ENGINEERING

1) Given a function to be as an equation (1)

$f(x) = \pi$ find $\lim_{x \to 3} f(x)$

$f(x) = \pi$

2) The model of a system has been developed by an Engineer to be as given in equation (2)

$f(x) = 5x - 21$

Given that $\theta = -1$ and using a step of 0.01 demonstrate in tabular form that limit of the model as $x \to 6$ is equal to 9.

f(x)	9-θ	9+θ	f(x)
8.50	5.90	6.10	9.50
8.55	5.91	6.09	9.45
8.60	5.92	6.08	9.40
8.65	5.93	6.07	9.85
8.70	5.94	6.06	9.80
8.75	5.95	6.05	9.25
8.80	5.96	6.04	9.20
8.85	5.97	6.03	9.15
8.90	5.98	6.02	9.10
8.95	5.99	6.01	9.05
9.00	6.00	6.00	9.00

Since the right hand limit (RHL) and Left hand limit (LHL) are equal to 9 therefore

$\lim_{x \to 6} (5x - 21) = 9$

3) Find the limit of the model given as

$\lim_{x \to 3} \frac{8 - x}{|8 - x|}$

Solution

$$\lim_{x \to 3^+} \frac{3-x}{|3-x|} = \lim_{x \to 0} \frac{3-(3+x)}{|3-(3+x)|} = \frac{-x}{x} = -1$$

4) Evaluate the limit of the model given as $\lim_{x \to 3} \frac{x-3}{|x-3|}$

Solution

$$\lim_{x \to 3} \frac{x-3}{|x-3|}$$

$$= \frac{3-3}{|3-3|} = 0/0$$

: undefined. The limit does not exist

(5) Show that the function given in the equation below is continuous on the interval $f(x) = \sqrt{x-4}$

x	$f(x) = \sqrt{x-4}$
4	0
5	1.0
6	1.4
7	1.7
8	2.0